THREATS TO DUNES

Residential development and recreational use of beach areas threaten the stability and diversity of the dune environment. Placing structures within dune areas, and the heavy use of dunes by pedestrians and vehicles for access to the beach can destroy vegetation and contribute to the deterioration of dunes. Dunes are not permanent features of the landscape; they are features that may change rapidly over short time periods, especially when they are not anchored by vegetation.

These photographs illustrate the impact that 35 years (1968-2003) of development has had on Delaware coastal dunes. In 1968, Delaware's natural dune environments typically extended across a wide area along the coast, from the active shoreline zone back to the coastal salt marsh on the bay side. By 2003, many of these coastal dune zones were converted to individual homes and lots. Native coastal dune plants can be used effectively in the home landscape, preserving some of the natural diversity and environment in developed areas along the coast.

Delaware Coast, South of Indian River Inlet

Home construction and development have replaced dunes in this area.

Coastal storms can destroy even well established dunes. During a storm, high-energy waves may wash against the base of the dunes, eroding sand and undermining the seaward dune face. In extreme storms, the dune face may recede significantly and the dune itself may be destroyed.

As shown in these photos, large storms can cause extensive erosion, resulting in overwash of the beach and dune system. Sand and water may wash over or break through the dunes, spilling out onto the landward side of the barrier dune. Low-lying areas, such as a break in the dune system, are particularly vulnerable to overwash.

PROTECTING DELAWARE'S DUNES

There are many ways for individuals and communities to help protect Delaware's dunes and vegetation.

- **Place signs at the dune site to explain the importance of keeping off the beach grass and dunes.**
- **Restore damaged dunes, plant vegetation, and put up dune fencing to restrict traffic.**
- **Use designated dune walkovers and access points to control pedestrian and vehicular traffic flow across the dunes. Protect all planted areas from vehicles, pedestrians, and pets.**
- **Allow beach grass and dune vegetation to grow naturally. Mowing destroys the grasses' ability to trap sand and may kill the plants, so please do not cut or mow beach grass.**
- **Maintain a clear, clean, and natural dune environment. Items such as Christmas trees, cut shrubs, and yard clippings may smother dune vegetation and may also be a fire hazard. This type of debris should not be placed on the dune or beach. Similarly, items such as cars, trucks, bikes, and boats should be kept off of the dune.**
- **Avoid hard landscaping such as railroad ties, flower boxes, retaining walls, piling tops, large stones, brick, cement blocks, and concrete. These items are easily lifted by storm waves, becoming debris that can batter homes and adjacent buildings, and they may cause severe damage or property loss.**
- **All sand should remain on the dune and beach system. If there is a problem with drifting sand, please contact the DNREC Division of Soil and Water Conservation at 302-739-4411.**

For additional information, contact:

Delaware Department of Natural Resources and Environmental Control (DNREC)
www.dnrec.state.de.us/dnrec2000/

Delaware Sea Grant Program Marine Advisory Service
www.ocean.udel.edu • 302-645-4346
Cape May Plant Materials Center • 609-465-5901
http://plant-materials.nrcs.usda.gov/njpmc/

DNREC Division of Fish and Wildlife
www.dnrec.state.de.us/fw/index.htm
Natural Heritage Program • 302-653-2880 or 2881
www.dnrec.state.de.us/fw/wildrehe.htm
Association for Biodiversity Information
www.natureserve.org/

DNREC Division of Soil and Water Conservation
Shoreline and Waterways Management Section
www.dnrec.state.de.us/dnrec2000/Divisions/Soil/Soil.htm
302-739-4411

Before planning or initiating any activity on the beaches or dunes, contact Delaware Department of Natural Resources and Environmental Control Shoreline and Waterways Management Section for permitting information: 302-739-4411

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Delaware's Coastal Dunes

Sand dunes are an integral part of Delaware's beach system. They are resilient natural barriers to the destructive forces of coastal storms, and they offer the least expensive and most efficient defense against flooding tides and waves.

Well-maintained dune areas preserve and enhance the beauty and value of the coast and coastal ecosystems, while providing important natural habitat for plants and animals.

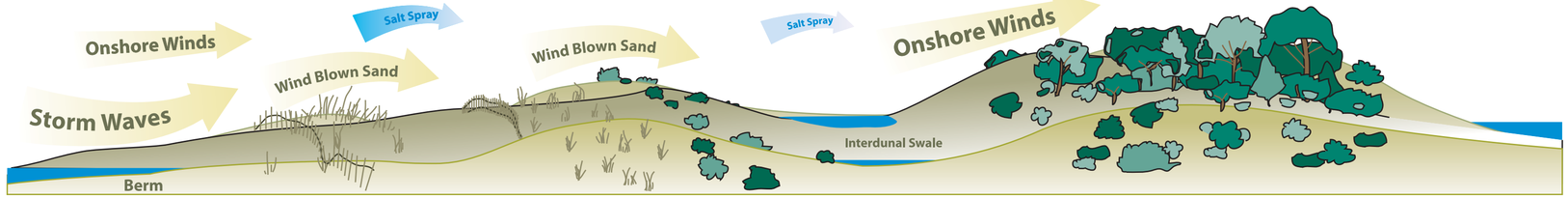
THE DUNE ENVIRONMENT

If you walk across the beach from the water's edge along Delaware's shoreline, you will come upon sand dunes. These mounds of windblown sand are vital to shoreline stability. They protect the coast during storms, provide a reservoir of sand for the beach, and sustain a unique ecosystem. Dunes in any beach area can be divided into several zones, as shown on the adjacent pages.

The primary dune is the first sandy ridge backing the beach. The few hardy grasses that can live here are pioneers in dune formation because they trap blowing sand and hold it in place. The grasses adapt to being buried by the sand and grow right up through the deposits. They also can withstand temperatures at the sand's surface that may reach 120 degrees on a hot summer day, and they thrive on the high salt content of sea spray.

A variety of plants and animals live on the dunes, from beach grass and ghost crabs to hairy wolf spiders, velvet ants, and digger wasps. In the spring, terns are among the shorebirds that rely on the dunes for nesting grounds. Their well-camouflaged eggs match the color of the sand. In the fall, the yellow blossoms of seaside goldenrod attract monarch butterflies on their southward migration.

More stable secondary dunes are located behind the primary dunes. Low plants—such as beach heather, seaside goldenrod, and prickly pear cactus—may colonize this region. Farther back in the dune system, they mingle with small trees and woody shrubs such as bayberry and beach plum, and the swallows that feast on their fruit. Even the most stable areas of the dunes, farthest from the beach, are zones where trees and shrubs are fairly short and stubby due to the effects of strong coastal winds, salt spray, and sand blasting.



BEACH/FOREDUNE

- Sea Rocket
- Seabeach Orach
- Seaside Spurge
- Trailing Wild-Bean

FOREDUNE/DUNE

- American Beachgrass
- Dune Sandbur
- Panic Beachgrass
- Purple Sandgrass
- Saltmeadow Hay
- Sea Rocket
- Seabeach Primrose
- Seaside Goldenrod
- Trailing Wild-Bean

DUNE/BACK DUNE

- American Beachgrass
- Beach Heather
- Beach Plum
- Broom-Sedge
- Common Yucca
- Eastern Prickly Pear Cactus
- Panicum
- Pinweed
- Seashore Elder
- Seaside Goldenrod

INTERDUNAL SWALE (WET)

- Bushy Bluestem
- Groundsel Bush
- Highbush Blueberry
- Large Cranberry
- Marsh St. Johns-Wort
- Panic Grass
- Pine Barren Goldenrod
- Red Chokeberry
- Red Maple
- Royal Fern
- Saltmeadow Hay
- Sweet Pepperbush
- Tickseed Sunflower
- Virginia Chain Fern

MARITIME FOREST SECONDARY DUNE

- Bayberry (Northern & Southern)
- Beach Plum

- Eastern Prickly Pear Cactus
- Oak (Blackjack, Post, South Red)
- Pine (Virginia, Pitch, Loblolly)
- Red Cedar
- Saltmeadow Hay
- Sweet Goldenrod
- Wax Myrtle
- Wild Black Cherry
- Winged Sumac

GENERAL COASTAL LANDSCAPE

- American Holly
- Broom Sedge
- Butterfly Milkweed
- Downy False-Foxglove

- Goldenrod
- Post Oak
- Scrub Oak
- Shortleaf Pine
- Sumac

WETLAND AREAS
(SALTWATER/BRACKISH)

- Black-Grass Rush
- Glasswort
- Groundsel Bush
- Marsh Elder
- Saltmarsh Bulrush
- Saltmeadow Hay
- Sea Lavender
- Sea Pink
- Seashore Saltgrass
- Smooth Cordgrass
- Swamp Rosemallow
- Threesquare
- Virginia Seashore Mallow

This cross-section of a typical Delaware beach/dune/backdune/wetland zone lists some common flora found in and around Delaware sand dunes and coastal environments. Please avoid planting non-native or exotic species that can spread and destroy native vegetation. Planting a combination of native species can enhance the beach-dune system's diversity and long-term viability.

DUNE PLANTS have adapted to harsh environmental conditions—such as high temperatures, dryness, occasional inundation by saltwater, salt spray, and the accumulation of sand. Generally, native beach grasses, trailing vines, and small perennials are the most hardy species and are found on the seaward face of the dunes. Low-lying areas between and behind dunes, also called *interdunal swales*, are often occupied by wetland vegetation. Shrubs and trees, often pruned to smaller sizes by windborne salt spray, are more abundant in the more landward back-dune zone.

Native coastal vegetation protects the beach and dune system. Vegetation enhances the natural beauty of the coastal landscape and provides food, protective cover, and nesting sites for small animals. Whenever possible, coastal property owners should incorporate native vegetation into their dune and garden landscape plans. These plants are well adapted to life at the coast and are easy to maintain. They require less water, fertilizer, and pesticides, which ultimately save time, money, and reduce pollution from unnecessary chemicals. Moreover, native coastal dune plants help protect the area by stabilizing the sand with deep roots and by trapping new sand to build and maintain the dune.